

CLAIMS

1. A method for passage control of an unmanned mine vehicle, the method comprising:

limiting in a mine at least one predefined operation area (4) where one or more unmanned mine vehicles (2) operate; and

preventing unallowed access of the unmanned mine vehicle (2) to a manual area (10) limited outside the operation area (4), **characterized** by

transferring the mine vehicle (2) from the operation area (4) to the manual area (10) or vice versa through at least one access station (8), the passage station (8) being arranged between the operation area (4) and the manual area (10);

performing the transfer of the mine vehicle (2) in the passage station (8) through a first access gate (9) and a second access gate (11) and further through an intermediate space (12) between the access gates (9, 11); and,

during the transfer of the mine vehicle (2), keeping at least one access gate (9, 11) closed at a time.

2. A method as claimed in claim 1, **characterized** by continuing the operations of the mine vehicles (2) in the operation area (4) uninterruptedly regardless of transfers of unmanned mine vehicles (2) in the passage station (8).

3. A method as claimed in claim 1 or 2, **characterized** by driving the mine vehicle (2) unmanned from the operation area (4) to the intermediate space (12) and, correspondingly, from the intermediate space (12) to the operation area (4), and

driving the mine vehicle (2) manned from the intermediate space (12) to the manual area (10) and, correspondingly, from the manual area (10) to the intermediate space (12).

4. A method as claimed in any one of the preceding claims, **characterized** by detecting the approach of the mine vehicle (2) to the passage station (8) by means of at least one detection point (13).

5. A passage control system of a mine, the system comprising:
at least one operation area (4) for at least one unmanned mine vehicle (2);

at least one gate (3a to 3m) for preventing unallowed access of the

unmanned mine vehicle (2) to a manual area (10) outside the operation area (4); and

means for opening and closing the gates (3a to 3m) limiting free access of mine vehicles (2), **characterized** in that

the system comprises at least one access station (8), which is arranged between the operation area (4) and the manual area (10) and through which the mine vehicle is arranged to be transferred from the operation area (4) to the manual area (10) and vice versa;

that the passage station (8) comprises two openable and closable access gates (9, 11) arranged successively at a distance from each other;

that the first access gate (9) is in the operation area side (4) and the second access gate (11) is in the manual area side (10);

that there is an intermediate space (12) between the first access gate (9) and the second access gate (11); and

that the passage control system is arranged to control the passage station (8) so that when the mine vehicle (2) is in the intermediate space (12), at least one access gate (9, 11) is closed.

6. A system as claimed in claim 5, **characterized** in that the operation of the passage station (8) is independent of the mine vehicles (2) operating in the operation area (4).

7. A system as claimed in claim 5 or 6, **characterized** in that the mine vehicle (2) is arranged to be transferred unmanned from the operation area (4) to the intermediate space (12) and, correspondingly, from the intermediate space (12) to the operation area (4), and

that the mine vehicle (2) is arranged to be transferred manned from the intermediate space (12) to the manual area (10) and, correspondingly, from the manual area (10) to the intermediate space (12).

8. A system as claimed in any one of claims 5 to 7, **characterized** in that the system comprises at least one detection point (13, 14), which is arranged to detect the mine vehicle (2) approaching the access gate (9, 11) from the operation area (4).

9. A passage station for mine vehicles, the passage station (8) comprising at least one gate, which is arranged in a mine between an operation area (4) limited for unmanned mine vehicles (2) and a manual area (10) limited outside the operation area, and through which access station (8) the mine ve-

hicle (2) is arranged to be transferred from the operation area (4) to the manual area (10) and vice versa, **characterized** in that

the passage station (8) comprises two openable and closable access gates (9, 11) arranged successively at a distance from each other;

that the first access gate (9) is in the operation area side (4) and the second access gate (11) is in the manual area side (10);

that between the first access gate (9) and the second access gate (11) there is an intermediate space (12), to which the mine vehicle (2) can be driven through an access gate (9, 11); and

that the passage station (8) comprises at least one control device, which is arranged to control the passage station (8) so that when the mine vehicle (2) is in the intermediate space (12), at least one access gate (9, 11) is closed.